



In Reply Refer to:

United States Department of the Interior

FISH AND WILDLIFE SERVICE

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Michael T. Lesar, Chief
Rules and Directives Branch
Division of Administrative Services
Office of Administration
Mailstop T-6D59, U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

RECEIVED

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RULES AND DIRECTIVES
BRANCH
USNRC

Dear Mr. Lesar:

The U.S. Fish and Wildlife Service (Service) has reviewed the Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) and to conduct a scoping process for the license renewal of the AmerGen Energy Company, LLC (AmerGen) (applicant) Oyster Creek Nuclear Generating Station, in the Township of Forked River, Ocean County, New Jersey. The project is located on the South Branch of the Forked River and on Oyster Creek, two waterways that discharge into Barnegat Bay. The following comments also reflect an assessment of a report entitled "Applicant's Environmental Report - Operating License Renewal Stage, Oyster Creek Generating Station" (undated).

INTRODUCTION

AmerGen has submitted an application to the Nuclear Regulatory Commission (NRC) to continue operation of its Oyster Creek Nuclear Generating Station for an additional 20 years (the applicant's preferred alternative). The nuclear plant has been in operation since 1969, and its license is due to expire on April 9, 2009. On October 11 through 13, 2005, the Service attended several interagency scoping meetings with the applicant, the NRC, and representatives from the New Jersey Department of Environmental Protection (NJDEP) to discuss the project, current adverse impacts to fish and wildlife resources, and potential plant modifications and other mitigative measures that could offset these impacts. Currently, the power plant withdraws approximately 1.25 billion gallons of water per day from Barnegat Bay to aid in cooling the nuclear reactor. The intake of cooling water entrains and entraps an unknown quantity of aquatic biota from Barnegat Bay. Prior to the scoping meetings, the Service concluded with AmerGen on January 25, 2005 that the continued operation of the plant until 2029 would not adversely affect federally listed threatened and endangered species under Service jurisdiction.

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Call = M. Masarik (MTM2)

AUTHORITY

The following comments on the proposed activity are provided pursuant to the National Environmental Policy Act of 1969 (83 Stat. 852; 42 U.S.C. 4321 *et seq.*) (NEPA), Migratory Bird Treaty Act of 1918 (40 Stat. 755, as amended; 16 U.S.C. 703-712), and Section 7 of the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) (ESA), and do not preclude future comments pursuant to the NEPA on a Draft EIS or to the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq.*) regarding review for federal permit or license. The following comments are consistent with the intent of the Service's Mitigation Policy (Federal Register Vol. 46, No. 15, Jan. 23, 1981), which emphasizes that avoidance and minimization precede compensation, which is to be considered for unavoidable adverse impacts to fish and wildlife resources and supporting ecosystems.

GENERAL COMMENTS

The Service appreciates the opportunity to participate in the early planning of this project. The above-referenced 3-day interagency meetings allowed the regulatory and resource agencies and the applicant to discuss impacts to fish and wildlife resources. The Service offers the following comments and concerns to assist in project planning and for use in the NRC's NEPA document (EIS). These comments also reflect an assessment of the applicant's Environmental Report. The Service recommends that the following concerns, including the development of a mitigation plan, be resolved prior to completing the Draft EIS.

SPECIFIC COMMENTS

1. Federal Listed Species

As discussed in the Service's January 25, 2005 letter to AmerGen, except for an occasional transient bald eagle (*Haliaeetus leucocephalus*), no other federally listed or proposed threatened or endangered species under the Service jurisdiction are known to occur within the project area. Therefore, the Service concluded that the proposed project would not adversely affect federally listed species under Service jurisdiction.

Due to the recent nesting successes of bald eagles in New Jersey, a possibility exists that a pair of eagles could nest on or adjacent to the project area in New Jersey during the NRC's regulatory review or during the life of the renewed license (if approved). The NRC and AmerGen were notified at the above scoping meetings of the possibility of future eagle nesting. Should nesting occur in the project area during the NRC re-licensing process or during the life of any renewed license, additional consultation pursuant to Section 7 of the ESA would be necessary. We recommend that the NRC obtain a status update of the bald eagle prior to its approval of any license renewal.

The Service also recommended (not required) in its January 25 letter, that AmerGen retain a qualified botanist to conduct a survey to determine the presence of any rare plants, including the federally listed Knieskern's beaked-rush (*Rhynchospora knieskernii*) and swamp pink (*Helonias bullata*), and the federal candidate bog asphodel (*Narthecium americanum*) in the project area.

These species have been documented within 1.5, 2.8, and 1.3 miles (respectively) of the project area. Since re-licensing is not expected to impact project area wetlands, the Service recommended, rather than required, a botanical survey. To date, the Service is unaware of any botanical survey conducted in the project area. Surveys for the above species would be necessary if any project alternatives or mitigative measures were to involve project area wetlands that might support these species.

No further consultation pursuant to Section 7(a) (2) of the ESA is required with the Service at this time. If project plans change (e.g., to involve project area wetlands) or if new information is obtained that indicates the occurrence of a federally listed species at the proposed project site(s), this determination may be reconsidered. The Service provides the above determination with respect to federally listed or proposed threatened or endangered flora and fauna under the Service jurisdiction only. The proposed project is located on Barnegat Bay and may affect federally listed marine turtles. Principal responsibility for threatened and endangered marine species is vested with the National Marine Fisheries Service (NMFS). We understand that the NRC has begun formal Section 7 consultation with the NMFS. This consultation should be completed prior to the NRC's issuance of the Draft EIS.

2. State Listed Species

The Service recommends that the NRC and the applicant continue working with the NJDEP to protect State-listed species and to obtain any other recommendations to modify plant operations to protect resources of State concern. Any mitigation plans should be developed prior to completing the Draft EIS. In addition, any botanical surveys conducted in the project area should include State-listed species.

3. National Environmental Policy Act

a. Project Purpose and Need

Under the NEPA, "purpose" and "need" are closely linked but subtly different. "Need" may be thought of as the problem and "purpose" as an intention to solve the problem. Clear statements of purpose and need are the basis for (1) identifying reasonable and practicable alternatives, (2) analyzing those alternatives in depth, and (3) selecting the preferred alternative.

The Service requests that the NRC demonstrate a public need for the continued operation of the Oyster Creek Nuclear Generation Station. Specifically, we request additional information on the current and projected electrical needs of the applicant's service area and whether other alternative sources of electricity are available, that could meet this need. The Service understands that the electrical transmission capability in New Jersey is deficient but growing and that the importation of electricity from other Northeast states and Canada could meet the public's need without the continuation of the Oyster Creek nuclear power facility. The Service has also obtained information from Conectiv Power, owner of one of the transmission lines that terminates at the applicant's substation, that "there is very significant electric generation available from existing power plants to meet that growth" (ENSR International, 2004). It appears that transmission capability and not generation is the most critical component to meeting the public's need for electricity. In addition, the applicant states in its

Environmental Report (page 7-11) that the “construction of new transmission lines could be required to ensure system reliability.”

The NRC Draft EIS should discuss the interrelationship between available transmission capability and electrical generation. This discussion should include several new transmission line upgrades recently constructed or planned in New Jersey and other sources of generated electricity from the Northeast that could meet the current and projected public need. The Service also recommends that the Draft EIS reflect that the Conectiv 230-kV transmission line is active. The applicant’s Environmental Report on page 3-6 states that the line has not been constructed.

b. Alternatives Analysis

The applicant has identified its preferred alternative as renewal of its operating license for an additional 20 years, without any plant modifications. The Service recommends that the applicant re-consider in its alternatives analysis the value to the aquatic environment of constructing a closed-loop cooling system or the employment of other project features (see below) that are designed to avoid or minimize adverse impacts to the aquatic environment. For example, the use of a closed-loop system would reduce intake cooling water volumes, when compared to the preferred alternative, by 90 percent (see the applicant’s Environmental Report page 7-19). Such an alternative would avoid many of the adverse environmental impacts that are currently occurring to the aquatic biota of Barnegat Bay (*i.e.*, entrapment, entrainment, and thermal impacts).

The continued operation of the Oyster Creek Nuclear Generating Station poses individual and cumulative impacts on the human environment. The continued use of 1.25 billion gallons of water per day from Barnegat Bay represents an adverse impact to the bay’s aquatic biota. The Service does not concur with the applicant’s conclusion that the impacts associated with its proposed 20-year license renewal would be small and do not warrant mitigation (see page 6-4 or the applicant’s Environmental Report). The intake velocities for plant cooling may approach 5.0 feet per second (fps). These velocities exceed the 0.5 fps criteria established for intake structures by the State (New Jersey Division of Fish, Game and Wildlife, undated). The U.S. Environmental Protection Agency’s (EPA) establishment of a 0.5 fps velocity for all new cooling water intake structures that draw from rivers, streams, or ocean waters of the United States (40 CFR Part 125.84 [b][2]) is consistent with the State’s requirements. Velocities of intake water that exceed 0.5 fps promote adverse impacts to aquatic resources due to entrapment or entrainment.

The Service recommends that the Draft EIS also include consideration of the following project features as a means to avoid or minimize impacts to the aquatic environment: placement of additional screening/netting or other project features (*e.g.*, bubble or sound deterrent systems) in the intake canal closer to Barnegat Bay; employment of flow reduction options during low peak demands; construction of a large water impoundment or recirculation structure on the Finnengar’s Farm to supplement the plant’s cooling water needs; or a combination of any of the above.

c. Cumulative Impacts

The Council on Environmental Quality (CEQ) regulations for implementing NEPA define cumulative impacts as “the impact on the environment which results from the incremental impact of the action when

added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions” (40 CFR Part 1508.7).

The NRC’s Draft EIS should document the adverse cumulative impacts that are occurring to the bay’s aquatic biota from thermal impacts (cold-water shock and heated water, as discussed below) and from entrapment or entrainment from passing through the circulation and dissipation pumps. Because the data discussed in the applicant’s Environmental Report are dated, it is difficult to ascertain the present level of cumulative adverse impacts. In addition, the NRC must consider the cumulative effects on the bay’s aquatic environment due to other actions such as mortality from recreational and commercial fishing. Without more relevant biological data on species use of the project area, the Service must conclude that cumulative impacts to the environment are more than minimal. Without meaningful biological data, the NRC’s Draft EIS should also conclude that cumulative adverse impacts would continue to occur with the applicant’s preferred alternative (license renewal), warranting substantial measures for compensatory mitigation.

d. Aquatic Impacts

When an agency is evaluating reasonable significant adverse effects on the human environment in an EIS, and information is incomplete or unavailable, the agency shall determine the reasonableness of including that information in an EIS (40 CFR Part 1502.22).

The Service recommends that the NRC postpone the issuance of its Draft EIS (June 2006) until additional ongoing biological studies (which began recently) are completed and information is available to assess plant operational effects on fish and wildlife resources. The results of these studies are essential for assessing potential adverse environmental impacts to the aquatic environment. The overall cost of obtaining this information is not exorbitant, as defined in 40 CFR Part 1502.22 (a) and is necessary to fulfill NEPA responsibilities to adequately assess individual and cumulative impacts (see cumulative effects discussion below). Information from the biological studies will yield, at a minimum, biomass losses of finfish and crustaceans from the applicant’s plant operation and projected adverse impacts to the aquatic environment if the license is renewed.

The applicant’s Environmental Report uses biological data derived from a 12-year period (1965 to 1977), to describe aquatic biota found in the project area; however, the age of the data (28 years) limits its value for assessing current and reasonably foreseeable future impacts. The applicant’s assertion that the impacts of entrainment of fish and shellfish are “small” (page 4-9) cannot be supported adequately with data that are most likely outdated. In addition, the assertion that impacts are small appears to contradict later statements in the applicant’s Environmental Report that numerous unavoidable adverse impacts to the aquatic environment are occurring (page 6-5).

The plant utilizes 1.25 billion gallons of water each day for cooling. Water from Barnegat Bay enters the Forked River, passes through several small, mesh screens and large circulating or dissipating pumps, is heated upwards of 24 degrees Fahrenheit as it passes through the heat dissipation chamber, and is then released into Oyster Creek, eventually flowing back into the bay. This cooling water entraps and entrains an unknown amount of aquatic biota, including

egg, larvae, juvenile, and adult finfish and crustaceans. The NJDEP (2005) reported that the Forked River drainage area provides habitat for river herring. The same report indicated that the Upper Branch of the Forked River had a herring spawning run, which no longer exists due to the combined effects of pollution, habitat displacement, man-made water course blockages, and over-fishing. Although not mentioned in the NJDEP report, it appears that Oyster Creek, just south of the Forked River drainage area, may have also lost a herring spawning run after a dam was built on the creek in the 1960s for the purpose of storing water for fire fighting capability at the nuclear plant. The proximity of the Forked River to the plant cooling intake structures makes it likely that any egg larvae or young-of-the-year herring originating from Forked River will pass through the plant's cooling system and be killed before entering Barnegat Bay.

Significant population changes have also occurred to several commercial and recreationally important finfish and shellfish species found in Barnegat Bay since the conclusion of the 12-year biological sampling study in 1977. The population of the hard clam (*Merceneria mercenaria*) and winter flounder (*Pseudopleuronectes americanus*) have dropped precipitously and the localized effects of the intake of over 1 billion gallons of water per day on these two species are unknown. In addition, the Atlantic Coast population of the striped bass (*Marone saxatilis*) has risen sharply from the mid-1980s. Striped bass and other marine species are known to utilize the intake and discharge areas of the project, but the extent of their use is unknown. The economic value of recreational fishing in New Jersey is high (see discussion on public access and recreation below). The effect of the discharge of hot water is unknown on recreational sport fish and other aquatic species. In addition, there have been several confirmed large fish kills due to cold water shock from winter plant closings. The NRC Draft EIS should document these fish kills and discuss the cumulative impacts of these kills in view of the data and available information concerning the aquatic biota that is entrapped on the cooling water intake structures or entrained in the heat dissipation chamber.

Because of the concerns outlined above, the Service recommends expansion of the current biological sampling study to a minimum of 3 years. A 3-year study would allow the NRC to more adequately determine what effects, if any, the plant's operation is having on aquatic biota. Obtaining this information does not appear to be cost prohibitive. The Service also recommends review of the current sampling method by the NJDEP, NMFS, Service, and other interested parties to ensure that information gathered will be adequate for assessing impacts to aquatic biota associated with plant operation. The Service also recommends collection of biological data for the life of the license in order to demonstrate that adverse impacts remain minimal over time. The license should contain conditions to require additional mitigation (see the discussion of mitigation below) should post-license data analysis confirm that additional or unforeseen adverse impacts are occurring.

e. Terrestrial Impacts

The applicant does not propose any new construction activities with the license renewal. However, during the inter-agency meetings noted above, the Service learned that a substantial amount of previously contaminated dredged material, stored in a confined disposal facility (CDF) just east of the plant on the Finnenger's Farm property, may require remediation and/or removal to an approved upland facility. A site visit revealed that the farm consists of several abandoned fields; an early successional

forest, including some maritime forest species; and pockets of both tidal and non-tidal wetlands. These types of vegetative cover provide valuable habitats for upland wildlife species. New construction activities (e.g., clearing and grubbing of upland vegetation, upgrading roads, or the construction of an offloading barge facility in Oyster Creek) would be expected if the CDF requires remediation or removal and would impact terrestrial species that utilize the farm. Therefore, the Service recommends clarifying any activities proposed on the Finnenger's Farm in the Draft EIS, including construction methods for any remediation of the CDF.

f. Mitigation

The CEQ requires inclusion of means to mitigate adverse environmental impacts in the EIS discussion of environmental consequences, if not covered in the description of the proposed action or alternatives (40 CFR Part 1502.16[h]). In addition, a mitigation plan (when necessary) is generally required prior to project authorization by the NJDEP. Therefore, the Service recommends that the NRC develop a mitigation plan for the proposed license renewal and discuss the plan in the Draft EIS. The mitigation plan should be developed in consultation with the NMFS, Service, and NJDEP and identify proposed means to avoid, minimize, and compensate (in that order) all adverse environmental effects on fish and wildlife resources. Consistent with the Service's Mitigation Policy, all in-kind options should be exhausted before considering out-of-kind mitigation. For example, the Service is aware that the NJDEP is considering restoration of several large wetland areas as potential mitigation. Although the Service encourages wetland restoration in most cases, this should only be employed as out-of-kind mitigation after the applicant has exhausted other direct compensatory options for adverse impacts to aquatic organisms (i.e., the removal of fish blockages for river herring or the development of long-term hard clam or other finfish or shellfish restoration projects).

During the October 11-13 interagency scoping meeting, the Service learned that a dam and pond were constructed just below the headwaters of Oyster Creek to store water for fire fighting capability at the plant. From a review of pre-1969 construction aerial photographs of the pond, it appears that Oyster Creek was a functioning waterway capable of supporting fish passage and possibly spawning habitat. Oyster Creek has the potential to offset expected adverse impacts from the proposed license renewal via the construction of a fish ladder. The Service can assist the NRC in identifying other potential fish ladder projects as potential mitigation for the preferred alternative.

OTHER SERVICE CONCERNS

1. Public Access and Recreation

Recreational fishing is a \$35 billion industry for the nation, with approximately 900,000 New Jersey recreational anglers expending nearly \$700 million annually for fishing tackle and other related purchases (U.S. Fish and Wildlife Service and U.S. Census Bureau, 2002). A key component to these economic benefits is unimpeded public access. A federal excise tax is collected from manufacturers of fishing equipment, as well as a portion of the federal fuel tax that is attributed to motorboat usage. Revenue is passed on to participating states. Since 1950, the Service's Federal Aid in Sport Fish Restoration Program has provided funds to state fish and wildlife agencies. The funding is used to restore, conserve, manage, and enhance fish species that are sought by recreational anglers, fund educational programs to enhance the public's understanding of aquatic resources and recreational

fishing, and to promote the development of responsible attitudes and ethics toward the aquatic environment.

Currently, recreational anglers fish in areas downstream of the hot water effluent in Oyster Creek. However, the public access points in this area are limited to the State Route 9 Bridge and several small shoreline areas. The Service recommends that the NRC work closely with the applicant, the NJDEP, and interested recreational fishing organizations to develop a comprehensive public access plan that would better address the recreational needs in the project area. A recreational use and access plan would be consistent with public access policies and regulations (Coastal Zone Management Act of 1972 (86 Stat. 1280; 16 U.S.C. 1451-1464). The Service is available to assist in the development of a public access plan.

2. Best Management Practices

The Service also recommends that, in association with implementing best management practices (BMPs), the NRC include provisions to control the spread of invasive species, such as *Phragmites australis* in the transmission line right-of-ways and the CDF on the Finnengar's Farm.

A draft Management Plan by the Chesapeake Bay Program's *Phragmites australis* Working Group (2003) includes recommendations to curb the spread of *Phragmites* through federal and state permit conditions, in order to help achieve a long-term goal of no net gain in *Phragmites* acreage. The Service has subsequently recommended initiation of a similar planning effort to control *Phragmites* in the Hackensack Meadowlands in Bergen and Hudson Counties, pursuant to Executive Order 13122 and under the auspices of the National Invasive Species Council. The Service recommends a similar program in the project area, including the two power line right-of-ways maintained by Conectiv and FirstEnergy and the CDF, with participation of the NRC. In the interim, the Service recommends that any federal authorization resulting in wetland disturbance (e.g., power line right-of-way maintenance, dredging, or excavation of the CDF) include conditions requiring: (1) BMPs to prevent the introduction or spread of invasive species, such as avoiding creation of elevated berms and the spread or burial of *Phragmites* rhizomes; (2) 2 to 5 years of post-construction monitoring to detect the introduction or spread of invasive species, and (3) control efforts, if *Phragmites* or another invasive species are detected (to include re-grading or hydrologic corrections for any construction-related disturbances that promote the spread of *Phragmites*, if other control methods [i.e., herbicides] prove insufficient in the long-term).

SUMMARY AND RECOMMENDATIONS

The Draft EIS should thoroughly address the purpose and need for the proposed action, alternatives and project viability. In addition, fish and wildlife issues must be adequately addressed pursuant to the NEPA, in determining direct, indirect and cumulative adverse impacts to fish and wildlife resources, and mitigation for unavoidable adverse impacts must be developed. In summary, the Service recommends that the NRC:

1. Obtain a status update of the bald eagle prior to any license renewal and conclude consultation with the NMFS regarding listed species under NMFS jurisdiction.

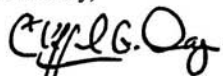
Appendix E

2. Conduct a survey to determine the presence of any federally listed or other rare species of plants, especially if any project area wetlands are evaluated as potential mitigation sites.
3. Continue coordinating with the NJDEP to protect State-listed species, and to obtain any other recommendations to modify plant operations to protect resources of State concern. Include State-listed species in any botanical surveys of the project area.
4. Provide further clarification regarding the need for the project in view of improved electrical transmission capacity in the Northeast and Canada. Include a discussion on the interrelationship between available transmission and electrical generation capability throughout the Northeast.
5. Confirm in the Draft EIS that the Conectiv 230-kV transmission line was constructed.
6. Evaluate other alternatives to obtain cooling water for the nuclear reactor, including the use of a closed-loop cooling system and constructing a large water impoundment or recirculating structure on Finnengar's Farm. Evaluate measures to minimize adverse impacts from the preferred alternative, reducing the need for cooling water during low peak usage, using additional fish screening closer to Barnegat Bay, and using bubble or sound deterrent systems to eliminate impacts to aquatic organisms.
7. Document in the Draft EIS all aquatic biota mortality attributable to plant operation, including but not limited to organisms entrapped, passing through the cooling chamber or dissipation pumps, or killed by thermal shock.
8. Postpone the issuance of the Draft EIS until completion of a 3-year biological study. Existing biological data are outdated and no longer reliable for assessing individual or cumulative adverse impacts to the aquatic environment. Please submit the aquatic biota sampling protocols to the Service, NMFS, and NJDEP for review. As noted, the sampling period should be expanded to 3 years.
9. Clarify statements made in the applicant's Environmental Report that impacts to the aquatic environment are small. The same report notes that unavoidable adverse impacts are occurring.
10. Collect biological data for the life of any approved license to demonstrate that future potential adverse impacts are no more than minimal.
11. Discuss the removal of contaminated dredged material from the CDF found on the Finnengar's Farm and specify any activities proposed.
12. Develop a mitigation plan with the Service, NMFS, and NJDEP to compensate for unavoidable adverse impacts prior to completion of the Draft EIS and for unforeseen impacts that may develop over the term of the license if renewed.
13. Develop a public access plan to address the recreational needs in the project area.

14. Develop BMPs for all construction activities and include provisions to control the spread of invasive species and monitoring with remedial provisions to ensure success.

The Service appreciates the opportunity to comment on the NOI and the applicant's Environmental Report. We recommend that the NRC continue close coordination with the Service and the NJDEP to ensure that fish and wildlife concerns are comprehensively addressed during preparation of the Draft EIS. Please keep us informed of your actions regarding the development of the Draft EIS. Mr. John Staples or Mr. Steve Mars of my staff are available to answer any questions on the content of this letter. They are available at (609) 646-9310, extensions 12 and 23, respectively.

Sincerely,



Clifford G. Day
Supervisor

REFERENCES

- Chesapeake Bay *Phragmites australis* Working Group. 2003. Common reed (*Phragmites australis*) in the Chesapeake Bay: a draft bay-wide management plan. U.S. Department of the Interior, Fish and Wildlife Service, Chesapeake Bay Field Office, Annapolis, Maryland. 30 pp. (Available online at <http://www.chesapeakebay.net/pubs/calendar/1NISW 2-10-3 Report 4 5129.pdf>.)
- ENSR International. 2004. Environmental Assessment prepared for the U.S. Fish and Wildlife Service for Land Exchange with Conectiv Power Delivery involving the Edwin B. Forsythe National Wildlife refuge, Galloway Township, Atlantic County, New Jersey. ENSR International Langhorn, Pennsylvania. 53pp. + Appendices.
- New Jersey Department of Environmental Protection. 2005. Locations of anadromous American shad and river herring during their spawning period in New Jersey's freshwaters including known migratory impediments and fish ladders. New Jersey Department of Environmental Protection, Division of Fish and Wildlife, Bureau of Freshwater Fisheries, Sicklerville, New Jersey.
- New Jersey Division of Fish, Game, and Wildlife. Undated. Basic criteria for intake structures. New Jersey Department of Environmental Protection, Division of Fish and Wildlife, Bureau of Freshwater Fisheries, Trenton, New Jersey.
- U.S. Fish and Wildlife Service and U.S. Census Bureau. 2002. 2001 National survey of fishing, hunting, and wildlife-associated recreation. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. and U.S. Department of Commerce, Census Bureau, Washington D.C. p.120 of 170 pp. (Available online at <http://www.census.gov/prod/2002pubs/FHW01.pdf>.)



**MEMORANDUM OF UNDERSTANDING
BETWEEN
THE NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION, AND
AMERGEN ENERGY COMPANY LLC
REGARDING THE COASTAL ZONE MANAGEMENT ACT REVIEW
FOR RENEWING THE OPERATING LICENSE FOR
THE OYSTER CREEK NUCLEAR GENERATING STATION**

PURPOSE

The New Jersey Department of Environmental Protection (NJDEP), and AmerGen Energy Company LLC (AmerGen) (collectively, the parties) hereby enter into this memorandum of understanding (MOU) concerning an application filed with the Nuclear Regulatory Commission (NRC) by AmerGen, seeking to renew the operating license for its Oyster Creek Nuclear Generating Station located within the coastal zone of the State of New Jersey.

STATEMENT OF FACTS

The parties agree to the following facts:

1. On January 21, 2005, AmerGen submitted to NJDEP a consistency certification under the Coastal Zone Management Act (CZMA) federal consistency provision (16 U.S.C. § 1456(c)(3)(A)) and National Oceanic and Atmospheric Administration's (NOAA's) regulations (15 C.F.R. part 930, subpart D);
2. On August 19, 2005, NJDEP objected to AmerGen's CZMA consistency certification based upon a lack of information. AmerGen must file its notice of appeal of NJDEP's August 19, 2005, objection with the Secretary by September 19, 2005;
3. Pursuant to the recently enacted Energy Policy Act of 2005 (Pub. L. No. 109-58), the Secretary of Commerce (Secretary) must use NRC's and NJDEP's decision records as the initial record to decide AmerGen's CZMA appeal. At the present time, NRC is in the initial stages of reviewing AmerGen's application to renew its operating license, and will be gathering additional technical and environmental information as part of its review that will be included as part of the record of its decision;
4. Under 15 C.F.R. § 930.51(f), federal consistency applies only to active applications. AmerGen filed its consistency certification six months before filing its application to renew its operating license with NRC on July 22, 2005; and

5. Under 16 U.S.C. § 1456(c)(3)(A) and 15 C.F.R. § 930.57(a), an applicant provides in the application to the federal licensing agency a consistency certification. This does not require the applicant to provide a consistency certification at the time the application is submitted; rather, the applicant (in this case AmerGen) provides the consistency certification when the applicant has the necessary data and information required by the CZMA and NOAA's regulations and at an appropriate time during the federal licensing agency's process (in this case NRC's process).

AGREEMENTS

Based upon the above statement of facts, the parties agree to the following:

1. AmerGen hereby withdraws its consistency certification, dated January 21, 2005, from NJDEP's consideration;
2. NJDEP hereby withdraws its consistency objection, dated August 19, 2005. NJDEP believes it will need the information described in NJDEP's August 19 objection letter, to respond to any consistency certification resubmitted by AmerGen under paragraph 3, below. AmerGen expresses no opinion regarding NJDEP's need for the information;
3. AmerGen shall resubmit to NJDEP its CZMA consistency certification and necessary data and information, pursuant to 15 C.F.R. part 930, subpart D, at an appropriate time during the NRC's review process;
4. Once NJDEP receives AmerGen's consistency certification and necessary data and information under paragraph 3 pursuant to 16 U.S.C. § 1456(c)(3)(A) and 15 C.F.R. part 930, subpart D, NJDEP's six-month review period shall begin;
5. If NJDEP objects to AmerGen's resubmitted consistency certification, AmerGen may file an appeal with the Secretary within the time frames established by NOAA's CZMA regulations;
6. The CZMA review prompted by AmerGen's consistency certification dated January 21, 2005, is hereby superseded by any subsequent review that shall occur once AmerGen resubmits its consistency certification as envisioned in paragraph 3. NJDEP and AmerGen shall retain all rights under the CZMA relative to this subsequent consistency certification; and
7. This MOU may be executed in counterparts.

Appendix E

SIGNATURES FOR MOU BETWEEN NJDEP AND AMERGEN REGARDING THE CZMA REVIEW FOR RENEWING THE OPERATING LICENSE FOR THE OYSTER CREEK NUCLEAR GENERATING STATION

For NJDEP
Mark Mauriello
Director, Land Use Regulation Program

Date

For AmerGen
Pam Cowan
Director, Licensing and Regulatory Affairs
AmerGen Energy Company LLC

Date

STATEMENT BY NOAA:

While NOAA is not a party to this MOU, it has no objections to its terms. Since both AmerGen's consistency certification and NJDEP's objection have been withdrawn, that proceeding has terminated. If a new consistency certification is submitted by AmerGen, and NJDEP issues an objection, the CZMA and NOAA regulations would allow AmerGen to file an appeal with the Secretary in that new proceeding.

For Joe La Bissonniere
Assistant General Counsel
NOAA Office of General Council for Ocean Services

9/19/05

Date

**SIGNATURES FOR MOU BETWEEN NJDEP AND AMERGEN REGARDING THE
CZMA REVIEW FOR RENEWING THE OPERATING LICENSE FOR THE OYSTER
CREEK NUCLEAR GENERATING STATION**

Mark D. Mauriello 9/19/05
For NJDEP Date
Mark Mauriello
Director, Land Use Regulation Program

For AmerGen Date
Pam Cowan
Director, Licensing and Regulatory Affairs
AmerGen Energy Company LLC

STATEMENT BY NOAA:

While NOAA is not a party to this MOU, it has no objections to its terms. Since both AmerGen's consistency certification and NJDEP's objection have been withdrawn, that proceeding has terminated. If a new consistency certification is submitted by AmerGen, and NJDEP issues an objection, the CZMA and NOAA regulations would allow AmerGen to file an appeal with the Secretary in that new proceeding.

Joel La Bissonniere Date
Assistant General Counsel
NOAA Office of General Council for Ocean Services

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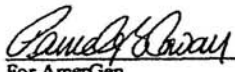
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**SIGNATURES FOR MOU BETWEEN NJDEP AND AMERGEN REGARDING THE
CZMA REVIEW FOR RENEWING THE OPERATING LICENSE FOR THE OYSTER
CREEK NUCLEAR GENERATING STATION**

For NJDEP
Mark Mauriello
Director, Land Use Regulation Program

Date



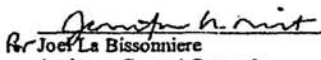
For AmerGen
Pam Cowan
Director, Licensing and Regulatory Affairs
AmerGen Energy Company LLC

9/19/05

Date

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Rr Joe La Bissonniere
Assistant General Counsel
NOAA Office of General Council for Ocean Services

9/19/05

Date

**ESSENTIAL FISH HABITAT ASSESSMENT
FOR RENEWAL OF THE OYSTER CREEK NUCLEAR GENERATING
STATION OPERATING LICENSE**

1.0 INTRODUCTION

The Magnuson-Stevens Fishery Conservation and Management Act, (FCMA) which was reauthorized and amended by the Sustainable Fisheries Act of 1996, sets forth the essential fish habitat (EFH) provisions designed to protect important habitats of Federally managed marine and anadromous fish species. The Act requires the eight regional fishery management councils to describe and identify EFH in their respective regions, to specify actions that would conserve and enhance EFH, and to minimize the adverse effects of fishing on EFH. Pursuant to the Act, Congress has defined EFH as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity”. Federal agencies that fund, permit, or undertake activities that may adversely affect EFH are required to consult with the National Marine Fisheries Service (NMFS) regarding the potential effects of their actions on EFH, and respond in writing to NMFS’s conservation recommendations. For the purpose of consultation, an adverse effect includes any impact that reduces the quality and/or quantity of EFH. The consultation document must include the following information:

- A description of the proposed action;
- An analysis of the potential adverse effects of the action on EFH and the managed species;
- The Federal agency’s conclusions regarding the effects of the action on EFH; and
- Proposed mitigation, if applicable.

On July 22, 2005, the U.S. Nuclear Regulatory Commission (NRC) received an application from AmerGen Energy Company, LLC (AmerGen), for renewal of the operating license (OL) of the Oyster Creek Nuclear Generating Station (OCNGS), which expires on April 9, 2009. As part of the application, AmerGen submitted an Environmental Report (ER) (AmerGen 2005a) prepared in accordance with the requirements of Title 10, Part 51, of the *Code of Federal Regulations* (10 CFR Part 51).

On September 22, 2005, the NRC staff published (NRC 2005a) a Notice of Intent to prepare a plant-specific supplement to the *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* (GEIS), NUREG-1437, Volumes 1 and 2 (NRC 1996,1999). During the development of the Supplemental Environmental Impact Statement (SEIS), the NRC staff visited the site, met with members of Federal and State regulatory agencies, spoke to local citizens, interviewed individuals who had conducted environmental research in Oyster Creek, Forked River, or Barnegat Bay, and reviewed a variety of technical reports, journal articles, and other relevant information to determine whether license renewal would result in adverse environmental impacts. This information and other sources relevant to EFH issues were

1 consulted during the development of this document. This EFH assessment has been
2 developed to fulfill the NRC requirement under the FCMA for the OCNGS license renewal
3 review.
4

5 **2.0 PROPOSED FEDERAL ACTION**

6
7 The proposed Federal action is renewal of the OL for OCNGS, a nuclear power plant that is
8 located in eastern New Jersey adjacent to Barnegat Bay. OCNGS is a single-unit plant with a
9 boiling-water reactor and steam turbine manufactured by General Electric. The reactor has a
10 design power level of 1930 megawatts thermal (MW[t]) and a net power output of
11 640 megawatts electric (MW[e]). Plant cooling is provided by a once-through cooling system
12 that draws cooling water from Barnegat Bay via the Forked River and a man-made intake canal,
13 and discharges heated water back to Barnegat Bay via a discharge canal and Oyster Creek.
14 The current OL for OCNGS expires on April 9, 2009. By a letter dated July 22, 2005, AmerGen
15 submitted an application (AmerGen 2005b) to the NRC to renew the OL for an additional
16 20 years of operation (i.e., until April 9, 2029). Details concerning the renewal of the OL can be
17 found on the NRC website (NRC 2006a).
18

19 **3.0 ENVIRONMENTAL SETTING**

20
21 OCNGS is located in eastern New Jersey, approximately 60 mi south of Newark, 35 mi north of
22 Atlantic City, and 50 mi east of Philadelphia, Pennsylvania (Figure 1). The nearest major water
23 body is Barnegat Bay, a protected estuary on the central New Jersey coast (Figure 2). OCNGS
24 is bounded on the north by the South Branch of the Forked River and on the south by Oyster
25 Creek (Figure 3). Barnegat Bay is a shallow, lagoon-type estuary that is separated from the
26 Atlantic Ocean by a nearly contiguous barrier island complex (Chizmadia et al. 1984;
27 BBNEP 2001). The bay is approximately 43 mi long and 3 to 9 mi wide. Depths range from
28 3 to 23 ft, with the greatest depths associated with the Intracoastal Waterway, a dredged
29 channel running parallel to the U.S. eastern seaboard (Chizmadia et al. 1984; BBNEP 2002).
30 The total quantity of water associated with the bay is estimated to be 60 billion gal
31 (Guo et al. 2004). The estuary is bordered by the mainland to the west, Point Pleasant and
32 Bay Head to the north, the barrier islands to the east, and Manahawkin Causway to the south.
33 Freshwater enters the bay from numerous streams, including, from north to south,
34 Manasquan River and Canal, Metedeconk River, Kettle Creek, Toms River, Cedar Creek,
35 Stout Creek, Forked River, and Oyster Creek (Chizmadia et al. 1984). Seawater enters the bay
36 from the north through the Point Pleasant Canal via Manasquan Inlet and from the south
37 through Little Egg Inlet. There is also an entrance to Barnegat Bay via Barnegat Inlet, a narrow
38 navigable passage to the Atlantic Ocean through the barrier islands located to the southeast of
39 Oyster Creek. The configuration of the Barnegat Inlet jetty system and the entrance channel
40 have undergone extensive modifications by the U.S. Army Corps of Engineers, and a major
41

Appendix E

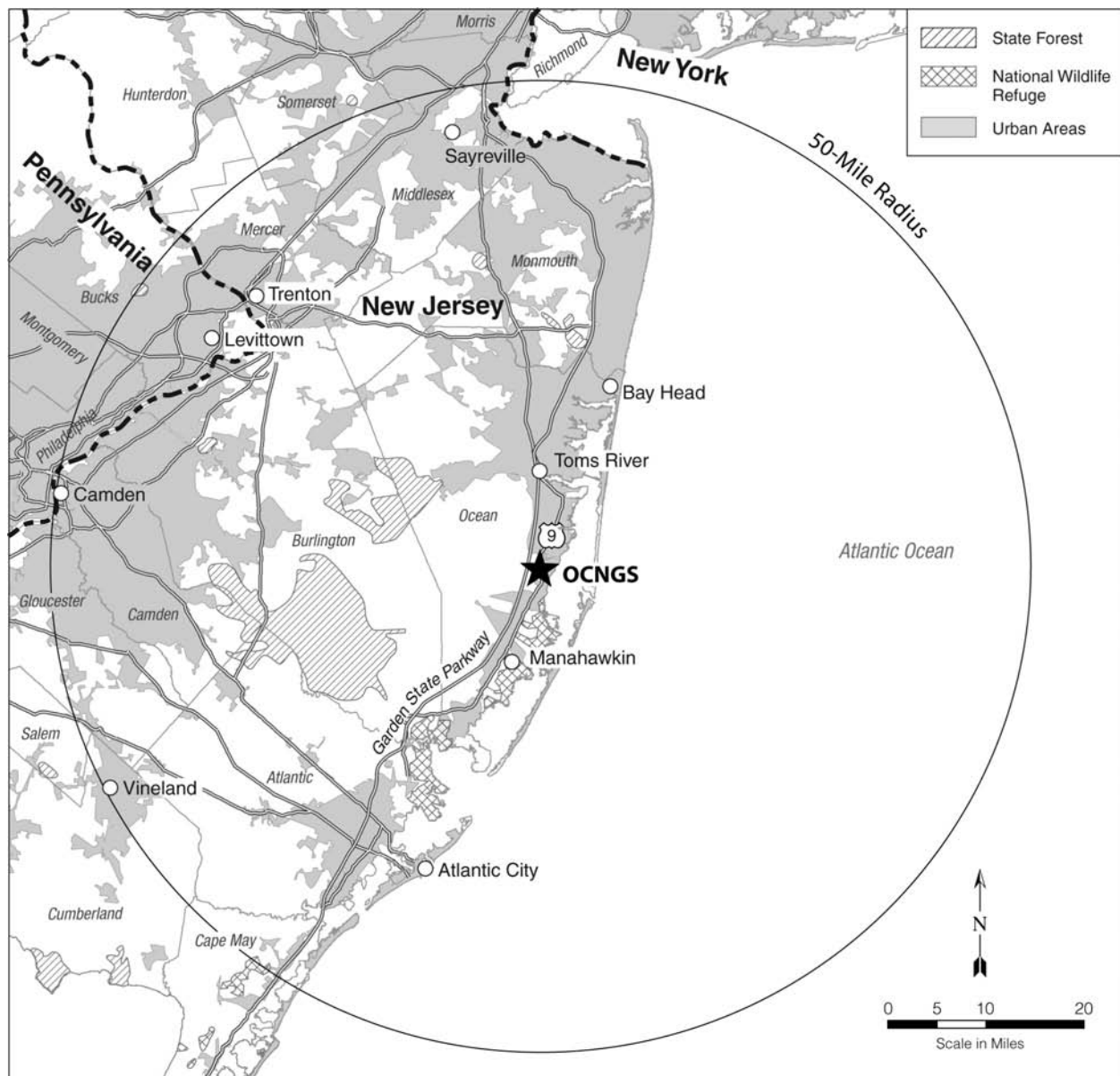


Figure 1. Location of Oyster Creek Nuclear Generating Station, 50-mi Region
(Source: AmerGen 2005a)

1 program was initiated in 1988 to realign the south jetty and dredge accumulated sediments
 2 from the channel to improve navigation (Seabergh et al. 2003). Because of the limited
 3 connection of Barnegat Bay to the Atlantic Ocean, tides in the bay are attenuated relative to the
 4 open ocean. Complete turnover of the water within the bay is estimated to occur every 96 tidal
 5 cycles with 1 tidal cycle completed every 12.7 hr (Chizmadia et al. 1984;

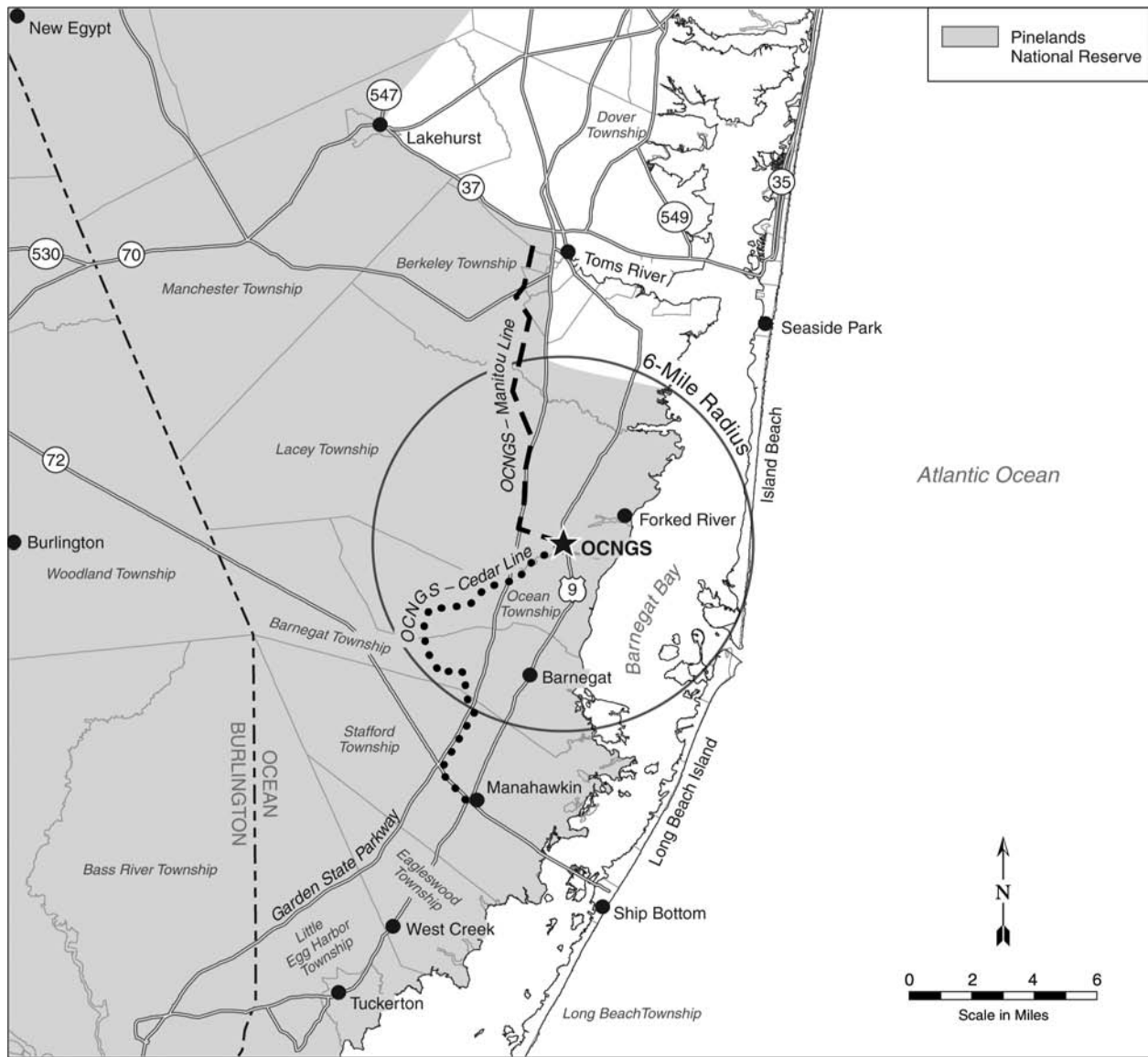


Figure 2. Location of Oyster Creek Nuclear Generating Station, 6-mi Region
(Source: AmerGen 2005a)

Guo et al. 2004). Salinity ranges from approximately 11 to 32 parts per thousand (ppt); the highest salinity is associated with the inlets, and the lowest is along the western shoreline near the mouths of various rivers and creeks. Water temperature in Barnegat Bay ranges from an average of 34.9 °F (1.6 °C) in winter to 73.4 °F (23.0 °C) in summer (Chizmadia et al. 1984; BBNEP 2001).

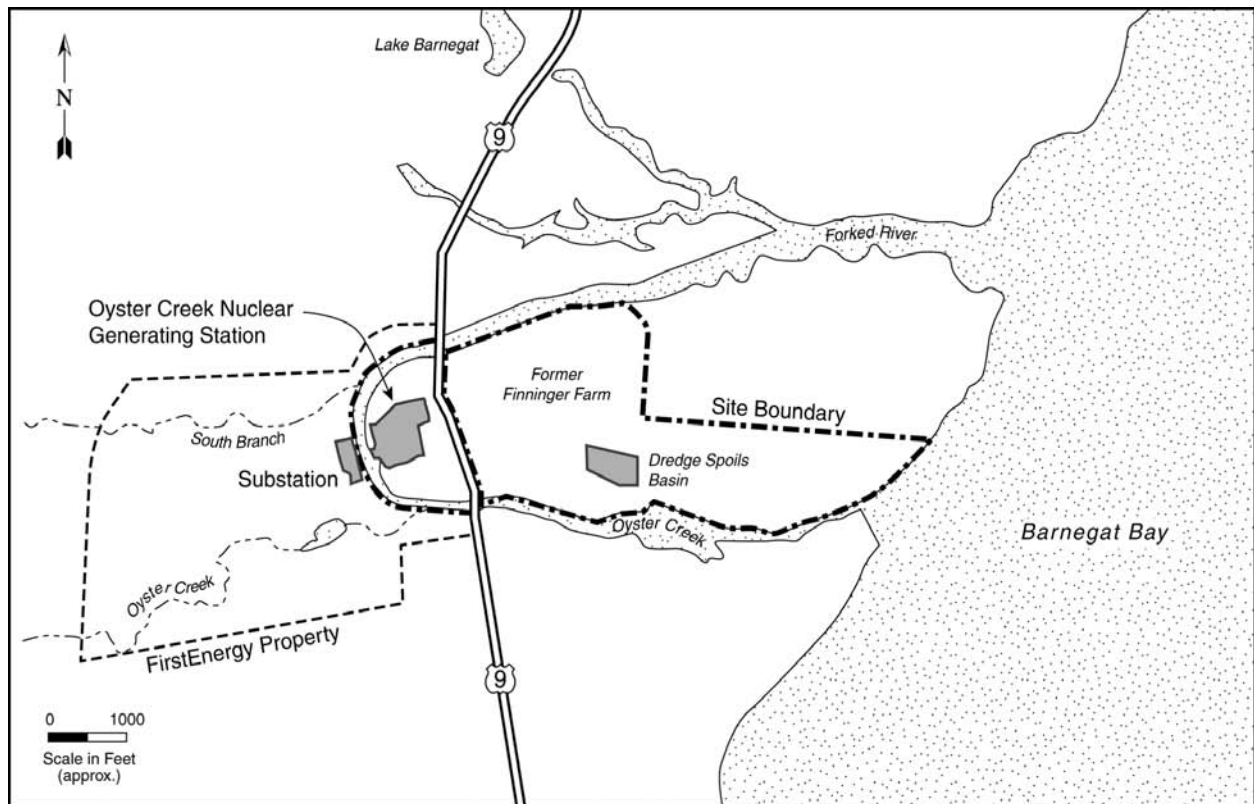


Figure 3. Oyster Creek Nuclear Generating Station Site Boundary
(Source: AmerGen 2005a)

The substrate of Barnegat Bay is typical of a shallow estuary. Central portions of the bay are composed primarily of fine to medium sand, with muddier sand present closer to the western shore. The intertidal areas adjacent to the mouths of Forked River and Oyster Creek are primarily sandy mud (Chizmadia et al. 1984). The barrier islands and mainland shores of Barnegat Bay support a network of salt marshes and other coastal wetlands that represent important habitats for juvenile fish and invertebrates (BBNEP 2001). In recent years, concern has been raised regarding the loss of salt marsh habitat along the Atlantic Coast (GLCF 2005). The cause of the observed losses is not known, but it is assumed to be a combination of sea level rise and hydrologic changes that result in an inadequate supply of sediment required for marsh maintenance (Hartig and Gornitz 2001).

4.0 PLANT COOLING-WATER SYSTEM DESCRIPTION

OCNGS has a once-through cooling system that uses water from Barnegat Bay. Cooling water is withdrawn from the bay via the South Branch of the Forked River, then through a 150-ft-wide

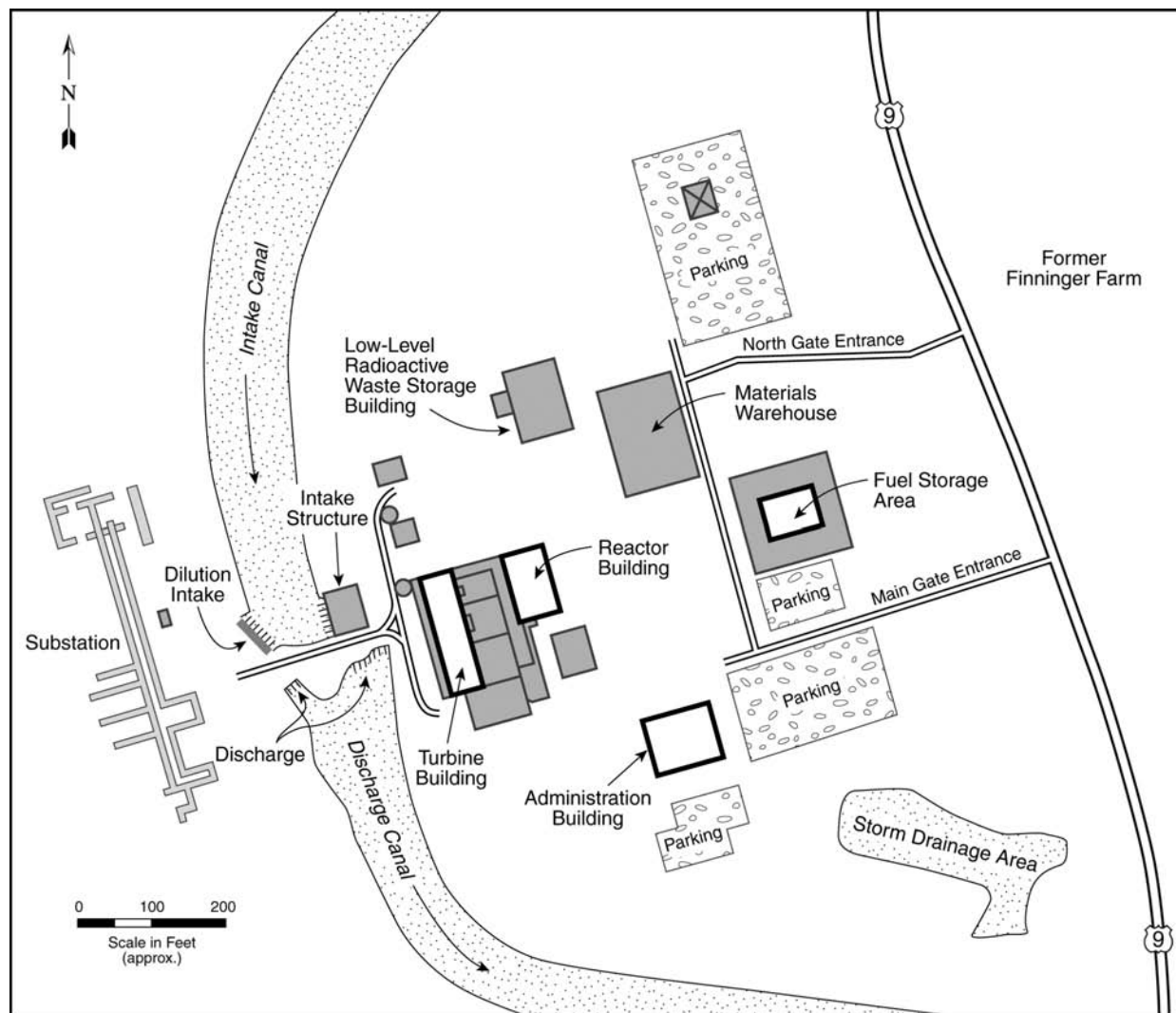


Figure 4. Oyster Creek Nuclear Generating Station Site Layout
(Source: AmerGen 2005a)

intake canal to the intake structure. Heated cooling water is discharged to a 150-ft-wide discharge canal that flows into Oyster Creek, which in turn flows into the bay. The intake and discharge canals are divided by a berm. Three dilution pumps move water from the intake canal directly into the discharge canal to lower the temperature of the station cooling water in the discharge canal. Details on the circulating-water system are presented below. Unless otherwise noted, the discussion of the circulating-water system was obtained from the Updated Final Safety Analysis Report (AmerGen 2003), the Final Environmental Statement for OCNBS operations (AEC 1974), or the ER (AmerGen 2005a).

Appendix E

The intake structure has two bays, each equipped with a trash rack, a 3/8-in.-mesh traveling screen, a screen-wash system, two service-water pumps, two emergency service-water pumps, and two circulating-water pumps. Each of the four circulating-water pumps located in the intake structure can provide up to 115,000 gallons per minute (gpm) of cooling water to the condensers. In addition to the circulating water system OCNGS has a separate service water system that provides cooling water to the reactor building and turbine building heat exchangers. An angled boom in the intake canal immediately in front of the intake prevents large mats of eelgrass and algae from clogging the intake system.

The trash racks are composed of nearly vertical steel bars on 3-in. centers, with effective openings of 2.5 in. After passing through the trash racks, water passes through 3/8-in.-mesh traveling screens equipped with Ristroph buckets. A low-pressure screen wash washes off impinged aquatic organisms and debris into the Ristroph buckets. The Ristroph buckets empty into a flume that conveys the fish and shellfish to the head of the discharge canal in the area of the dilution pump discharge (NJDEP 2005a).

Each bay of the intake structure has a service-water pump with a capacity of 6000 gpm, a second service-water pump with a capacity of 2000 gpm, two emergency service-water pumps each with a capacity of 4150 gpm, and a screen-wash pump with a capacity of 900 gpm. These pumps are located immediately downstream of the traveling screens. Service water provides cooling water to the reactor building and turbine building heat exchangers. The service water empties into the discharge canal.

Three dilution water pumps (low-speed, axial flow pumps with 7-ft impellers, each rated at 260,000 gpm) are located on the western side of the intake canal and are protected by trash racks. Because the dilution pump intakes lack traveling screens, fish may be drawn through the pumps. No impingement or entrainment safeguards are present; however, AmerGen contends that the pump design allows for some impingement and entrainment survivability (NJDEP 2005a). The purpose of the dilution pumps is to decrease the temperature of the discharge water, which otherwise would encourage migratory fish to stay during the spring and fall, and to reduce thermal stress on organisms in the discharge canal during the summer. The use of the dilution pumps is covered in the New Jersey Pollutant Discharge Elimination System (NJPDES) permit, which allows only two of the three pumps to operate concurrently during normal operations. During a station shutdown, dilution pumps are operated to minimize the impact of thermal shock on organisms in Oyster Creek and Barnegat Bay. In the winter, a recirculation tunnel transfers water from the discharge to the intake structure as needed to prevent icing.

Sodium hypochlorite is injected into the circulating-water and plant service-water systems, and chlorine gas is injected into the augmented off-gas/new radioactive waste service-water system to minimize fouling in the pipes and condensers. The main condenser's six sections are chlorinated one at a time so that the sections are consecutively chlorinated for 20 minutes each during the daily cycle for a maximum of 2 hours per day of chlorination for the entire condensor (NJDEP 2005a).

5.0 POTENTIAL IMPACTS OF PLANT OPERATION ON BIOTA AND HABITAT

The cooling-water system associated with OCNGS utilizes water from Forked River and Barnegat Bay and may affect EFH in the following ways:

- Impingement of juvenile or adult forms of fish and shellfish;
- Entrainment of eggs or larvae of fish and shellfish, or of phytoplankton and zooplankton that form the basis of the nearshore marine food webs; and
- Discharge of heated cooling water containing biocides or other chemicals into Oyster Creek and Barnegat Bay

These impacts are discussed in this section.

5.1 IMPINGEMENT

At maximum flow, with all circulating and dilution pumps operating, the OCNGS cooling-water system requires approximately 1.25 million gpm. However, the licensee normally does not operate more than two dilution pumps at a time so total plant flow is typically less than one million gpm. At this flow rate, the velocity in the intake and discharge canals is typically less than 2.0 ft/s, but the flow is sufficient to result in impingement of fish and shellfish on the traveling screens associated with the cooling-water intake system.

Impingement mortality studies were conducted between 1965 and 1977 on a variety of fish and shellfish species, including bay anchovy (*Anchoa mitchilli*), Atlantic silverside (*Menidia menidia*), winter flounder (*Pseudopleuronectes americanus*), Atlantic menhaden (*Brevoortia tyrannus*), sand shrimp (*Crangon septemspinosa*), and blue crab (*Callinectes sapidus*). Winter flounder exhibited the highest survival after impingement (77 to 93 percent), and bay anchovy exhibited the lowest survival (4 to 19 percent) (Summers et al. 1989).

5.2 ENTRAINMENT

During normal operations, a variety of organisms are entrained, including eggs and larvae of fish and shellfish occurring in Barnegat Bay or Forked River, and phytoplankton and zooplankton that contribute to the marine-estuarine food web in Barnegat Bay. The number and variety of entrained organisms vary seasonally and annually. The most commonly entrained organisms include juvenile and adult opossum shrimp (*Neomysis integer*); zoea, juvenile, and adult sand shrimp; eggs and larvae of the bay anchovy; and larvae of winter flounder.

5.3 THERMAL RELEASES

The discharge of heated water into Oyster Creek creates elevated temperatures (>86 °F [30 °C]) in the discharge canal and produces a thermal plume in Barnegat Bay that varies in extent and magnitude based on plant operation characteristics, ambient air and water temperatures, and hydrodynamic characteristics associated with wind and tide. These thermal emissions have the potential to affect food web dynamics, alter fish behavior, or produce acute or chronic impacts on temperature-sensitive species.

The NJDEP fact sheet (NJDEP 2005a) identified the following thermal surface-water quality standards applicable to OCNGS operations:

- Ambient water temperatures in the receiving waters shall not be raised by more than 4 °F (2.2 °C) from June through August, nor more than 1.5°F (0.8°C) from June through August, nor cause temperature to exceed 85°F (29.4°C), except in designated heat dissipation areas.
- Heat dissipation in streams (including saline estuarine waters) shall not exceed one-quarter of the cross section and/or volume of the water body at any time; nor more than two-thirds of the surface from shore to shore at any time.

Interruption of the flow of heated water from the plant, or failure of the dilution pump system, has resulted in a number of fish kills since OCNGS began operating in 1969. Fish kills associated with thermal fluctuations from 1972 to 1982 are summarized in Kennish (2001). Additional details on fish kills related to thermal fluctuations at OCNGS are provided in Section 4 of Supplement 28 to the GEIS (NRC 2006b).